Ordering number : EN 3315

Monolithic Linear IC



No.3315

LA7855, 7856

Very High Resolution CRT Display Synchronization

Overview

The LA7855, 7856 are sync-deflection circuit ICs dedicated to CRT display use. They can be connected to the LA7837, 7838 (for vertical output use) to form a sync-deflection circuit that meets every requirement for CRT display use.

The LA7855, 7856 are performance-improved versions of the existing LA7850, 7851. The LA7855, 7856 are intended for use in very high-definition display (f_H=64 to 150kHz) applications. When the horizontal frequency exceeds approximately 64kHz, problems are experienced with horizontal jitter which has been less of a problem in low-frequency display applications. The newly developed LA7855, 7856, which are fabricated with a special production process, are capable of suppressing horizontal jitter components successfully (30% reduced as compared with our existing similar Type Nos.). The LA7855, 7856 are ideally suited for use in high performance-required applications.

The LA7855, 7856 are pin-compatible with the LA7850, 7851, respectively. The LA7855, 7856 are different in the vertical sync pull-in range (LA7855 : 10Hz, LA7856 : 20Hz).

Features

- The horizontal oscillation frequency can be adjusted stably from 15kHz to 150kHz.
- The horizontal display can be shifted right/left.
- The horizontal/vertical sync input can be used intact regardless of the difference in pulse polarity and pulse width.
- The AFC feedback sawtooth wave can be obtained by simply applying a flyback pulse to the IC as a trigger pulse.
- Any duty of the horizontal pulse can be set.
- The LA7855, 7856 can be connected to the LA7837, 7838 to develop pictures with the interlace characteristics, crossover distortion characteristics improved.

On-Chip Functions

[Horizontal Block]

- Horizontal sync input
- Horizontal phase shift
- AFC sawtooth wave generator
- Horizontal pulse duty setting
- Horizontal OSC
- AFC
- X-ray protector

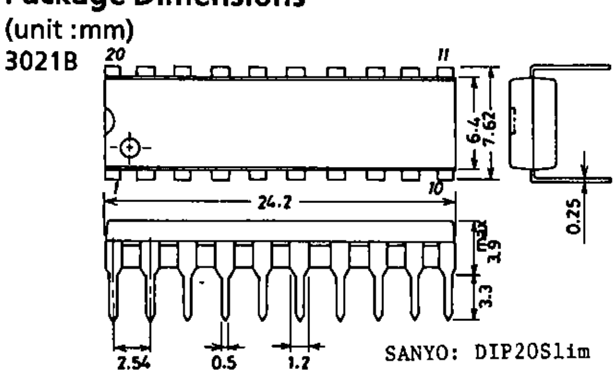
[Vertical Block]

- Vertical trigger input
- Vertical OSC
- Vertical sawtooth wave generator
- Sampling type DC voltage control

Package Dimensions

(unit : mm)

3021B



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Maximum Ratings at Ta = 25°C

				unit
Maximum Supply Voltage	V_{10}, V_{20} max		14	V
Allowable Power Dissipation	Pd max	Ta≦65°C	780	mW
Operating Temperature	Topr		–20 to +85	°C
Storage Temperature	Tstg		–55 to +125	°C

Operating Conditions at Ta = 25°C

			unit
Recommended Supply Voltage	V_{10}, V_{20}	12	V
Operating Voltage Rage	V_{10}, V_{20} op	9 to 13.5	V
Recommended Vertical Pulse Input Peak Value	V_{pulse}	5	Vp-p
Operating Vertical Pulse Input Peak Value Range	V_{pulse}	2 to 6	Vp-p
Recommended Horizontal Pulse Input Peak Value	H_{pulse}	5	Vp-p
Operating Horizontal Pulse Input Peak Value Range	H_{pulse}	2 to 6	Vp-p

Operating Characteristics at Ta = 25°C, V_{10}, V_{20} = 12V

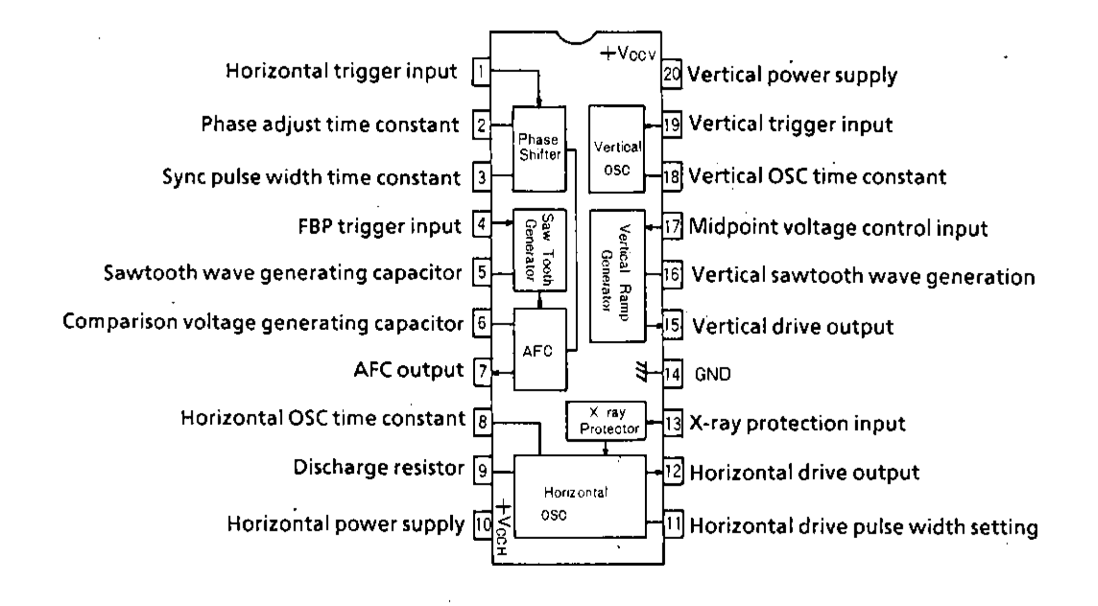
			min	typ	max	unit
V_{CC10} Current Dissipation	I_{10}		12		30	mA
V_{CC20} Current Dissipation	I_{20}		5		12	mA
Vertical Frequency Pull-in Range	$V_{p\,IN}$	Vertical sync 60Hz ( ) : LA7856	10.0 (21.0)		12.0 (23.0)	Hz
Vertical Free-running Frequency	f_V	f_V center 55Hz	50		60	Hz
Increased/Reduced Voltage Characteristic of Vertical Frequency	$\Delta f_{V.V}$	V_{20} = 12±1V, 55Hz at 12V	–0.1		0.1	Hz
Midpoint Control Threshold Level			3.8		4.4	V
Vertical OSC Start Voltage	$f_{V.st}$				4.0	V
Temperature Characteristic of Vertical Frequency		Ta = –10 to +60°C	–0.028		0.028	Hz/°C
Vertical Driver Amplification Factor	G_V		12		18	dB
Horizontal AFC DC Loop Gain	I_{AFC}		±0.85		±1.6	mA
Horizontal Free-running Frequency	f_H	f_H center 15.734kHz	–750		750	Hz
Horizontal OSC Start Voltage	$f_{H.st}$				4.0	V
Increased/Reduced Voltage Characteristic of Horizontal Frequency	$\Delta_{H.V}$	V_{10} = 12±1V, 15.734kHz at 12V	–50		50	Hz
Horizontal OSC Warm-up Drift	Δf_H	5s. to 30min. after application of power	–50		50	Hz
Temperature Characteristic of Horizontal Frequency		Ta = –10 to +60°C	–2.9		2.9	Hz/°C
Horizontal Output Drive Current	I_{12}		6.0		12.0	mA
Increased/Reduced Voltage Characteristic of Phase Shifter Delay Time		V_{10} = 12±1V	–0.5		0.5	%/V
Temperature Characteristic of Phase Shifter Delay Time		Ta = –10 to +60°C	–0.1		0.1	%/°C
Increased/Reduced Voltage Characteristic of Phase Shifter Pulse Width		V_{10} = 12±1V	–1.0		1.0	%/V
Temperature Characteristic of Phase Shifter Pulse Width		Ta = –10 to +60°C	–0.13		0.13	%/°C
AFC Phase Comparison Center Time		15.734kHz after F.B.P. input	9.9		11.5	μs
Increased/Reduced Voltage Characteristic of AFC Phase Comparison Center Time		V_{10} = 12±1V	–1.5		1.5	%/V
Temperature Characteristic of AFC Phase Comparison Center Time		Ta = –10 to +60°C	–0.2		0.2	%/°C
Comparison Waveform Generating Input Operation Voltage	V_4		0.65		0.95	V
Pin 13 Voltage at Hold-down Operation Start	V_{13}		0.55		0.85	V

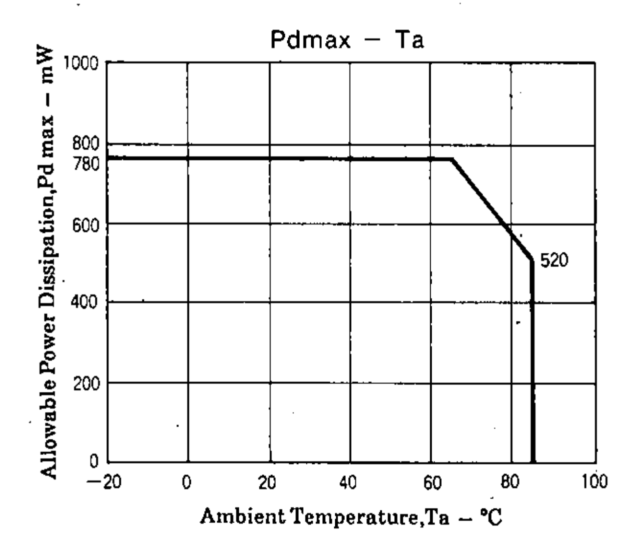
Correspondence with the Existing IC Series

LA7850 ———→ LA7855
LA7851 ———→ LA7856
LA7852 ———→ LA7857
LA7853 ———→ LA7858

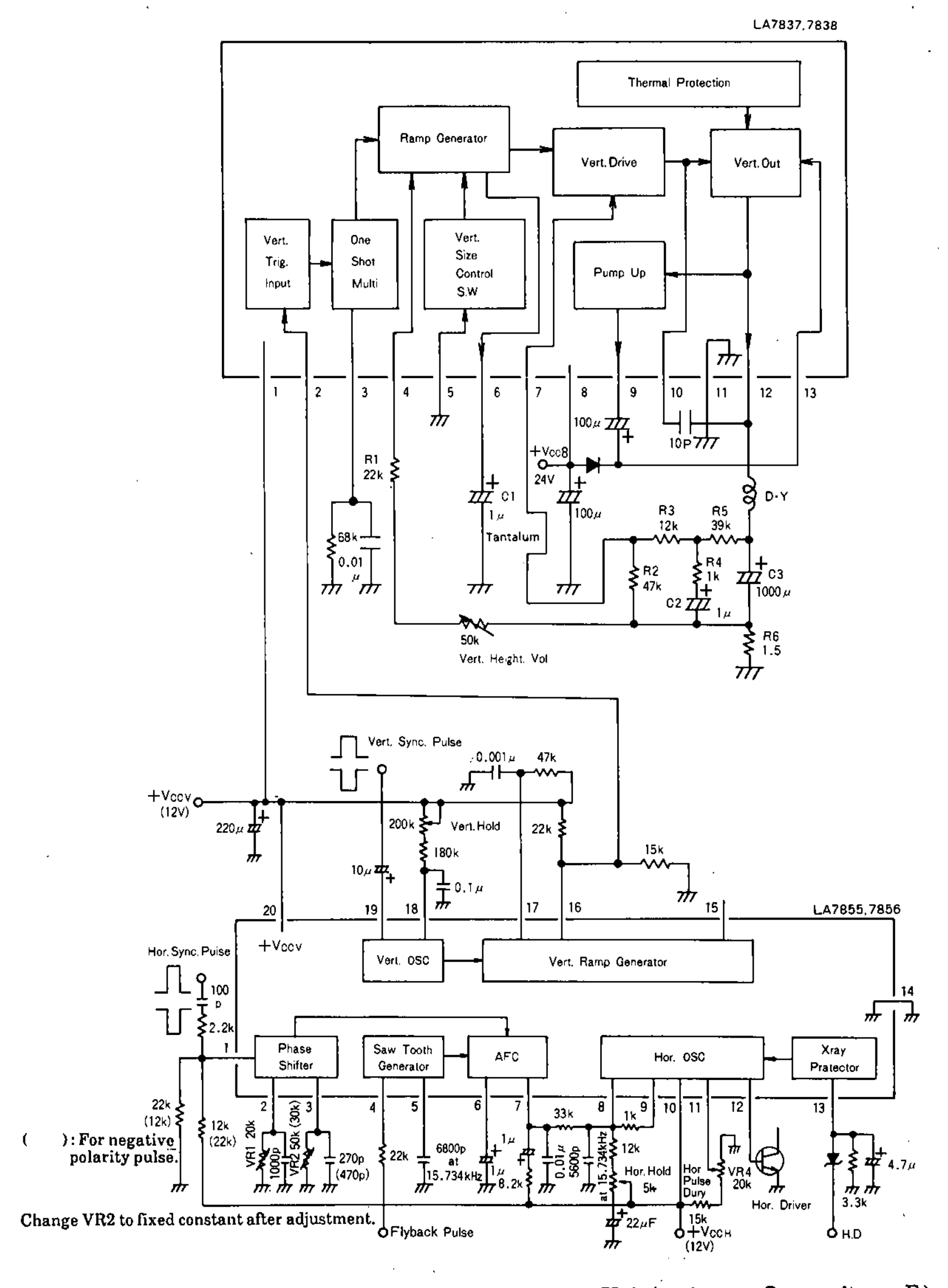
Type No.	Package	Vertical Pull-in Range	GND Pin
LA7850, 7855	DIP-20S	10Hz (at 60Hz)	Common to horizontal/vertical
LA7851, 7856	DIP-20S	20Hz (at 60Hz)	Common to horizontal/vertical
LA7852, 7857	DIP-22S	10Hz (at 60Hz)	Separated for horizontal/vertical
LA7853, 7858	DIP-22S	20Hz (at 60Hz)	Separated for horizontal/vertical

Equivalent Circuit Block Diagram





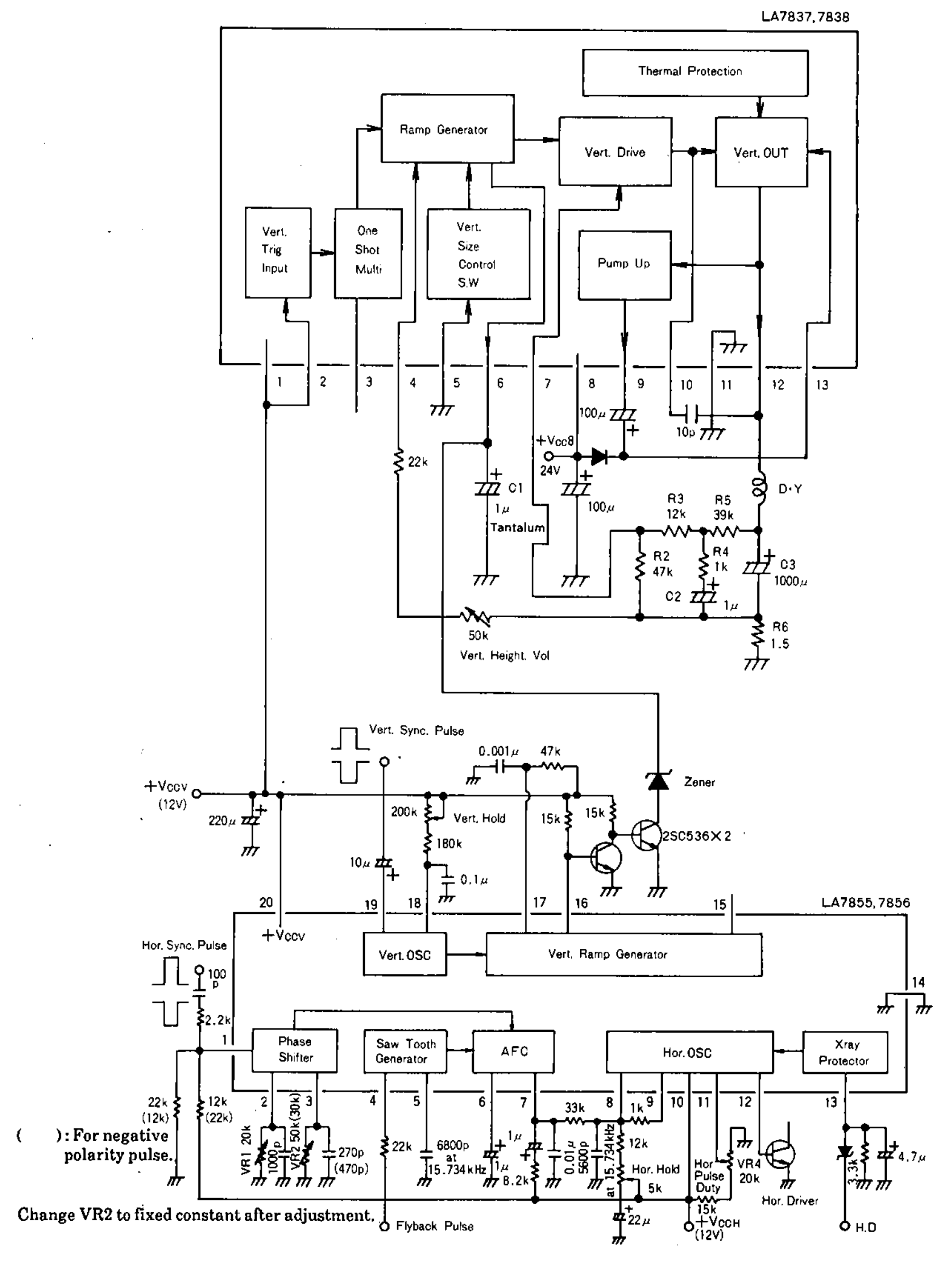
Sample Application Circuit : 14" monitor
Vertical retrace time≦700μs



Unit (resistance:Ω, capacitance:F)

Fig.1

Sample Application Circuit: 14" display
Vertical retrace time ≒ 300µs



( ): For negative polarity pulse.

Change VR2 to fixed constant after adjustment.

Unit (resistance:Ω, capacitance:F)

Fig.2

Precautions when using with vertical output ICs LA7837, 7838 :

The vertical output ICs LA7837,7838 are appropriate for use in monitors and displays because the interlace and crossover distortion responses are superior to those of the LA7835,7836.

However, since the vertical retrace time of displays is shorter than that of TV, the upper portion of the vertical picture may stretch. This is because the start waveform of the pin 6 sawtooth wave bends, as shown in Fig.3, due to the diode response of the clamp waveform. If there is not much time difference between T_1 and T_R, the upper portion of the vertical picture will tend to stretch. The use of a circuit as shown in Fig.2 will cause pin 6 waveform start wave to become linear, so that stretching is suppressed.

The example of circuit application shown in Fig.2 does not use the trigger input circuit (pin 2) and one-shot multivibrator (pin 3) built in the LA7837,7838 ; the pin 6 sawtooth wave is controlled by the LA7855,7856 vertical output pulse.

Therefore, the discharge circuit and clamp circuit are formed by the external Zener diode and transistor TR2.

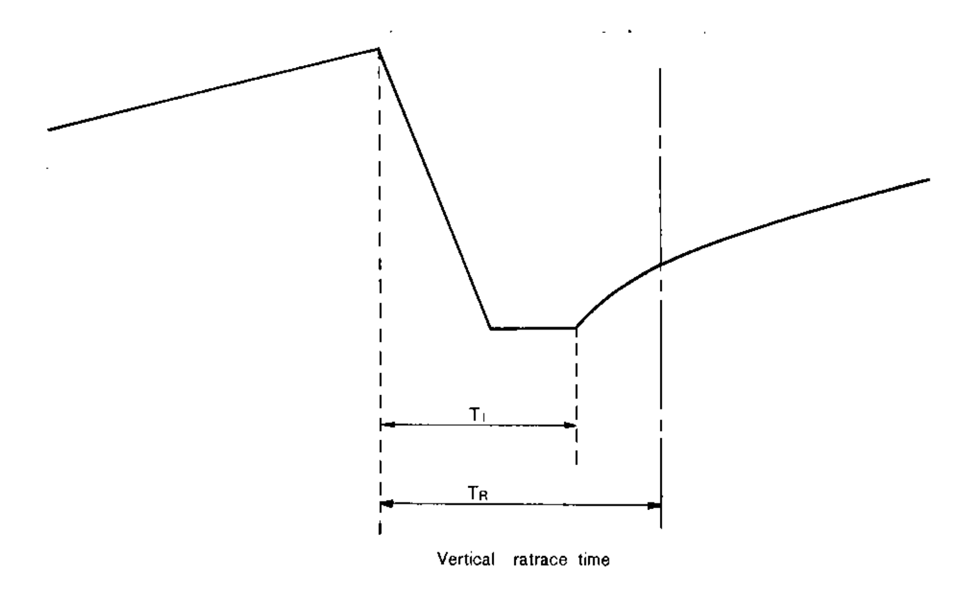


Fig.3

Design Example

For 12V pin 1 power supply

- On the LA7837,7838, pin 3 one-shot multivibrator operates when a trigger pulse enters pin 2. During this time, the sawtooth wave generator discharge circuit and clamp circuit inside pin 6 operate.

  The clamp voltage at this time is figured according to this formula :

  $$V_{CLAMP}=5/12 \cdot V_{CC} \quad \text{①}$$

  For 12V,

  $$V_{CLAMP}=5\,[V]$$

  Therefore, the Zener diode used in Fig.2 must be rated more than 5V (e.g. 5.6V), otherwise the clamp circuit inside the IC will operate.

For 9V pin 1 power supply

The same as for 12V, according to formula ① :

$$V_{CLAMP}=3.75\,[V]$$

So, the Zener diode must be rated more than 4V (e.g. 4.5V).

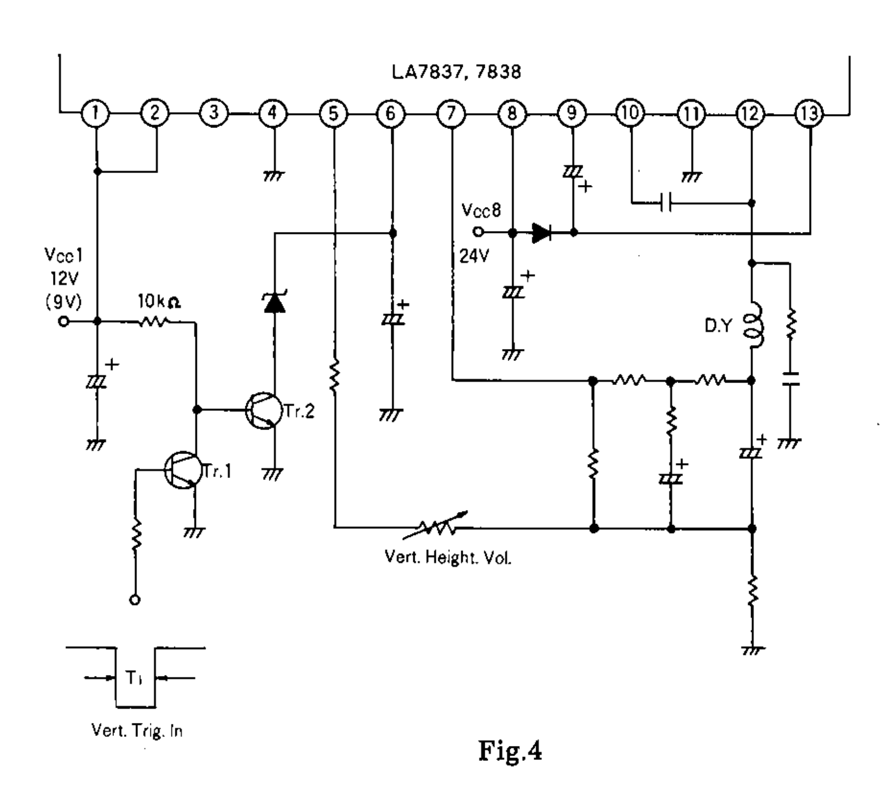


Fig.4

Pin 6 waveform when using the LA7837,7838 in a display application circuit (Fig.2)

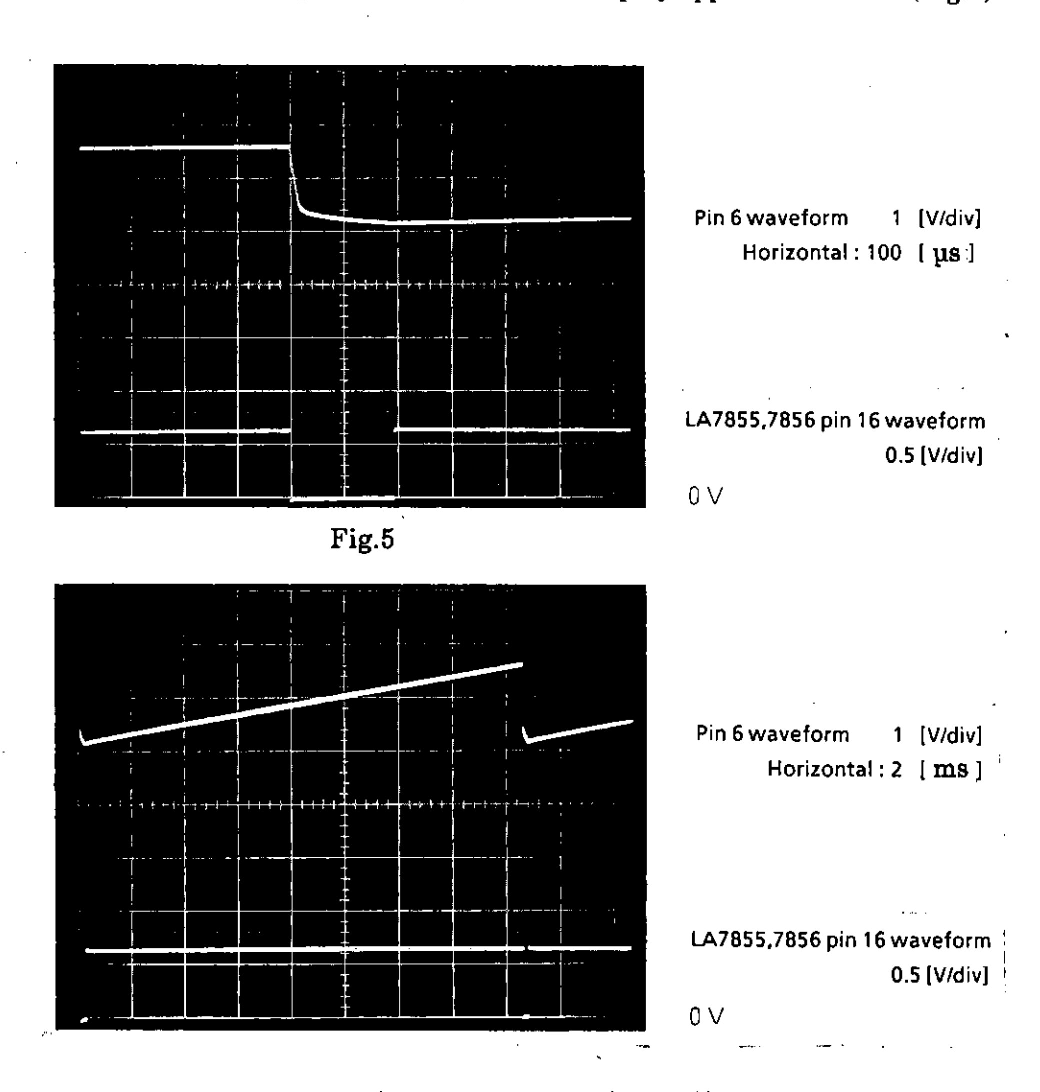


Fig.5

This catalog provides information as of **June , 1996 .** Specifications and information herein are subject to change without notice.